Joint Electronic Combat Test Using SIMulation (JECSIM)
Joint Test and Evaluation (JT&E)
4 January 2000

Subject:
Joint Electronic Combat testing using SIMulation (JECSIM) Joint Test and Evaluation (JT&E).

Background:
This is an OSD, DD,DT&E/S&TS sponsored JT&E. The JECSIM was chartered 23 August, 1996 with the United States Army, Navy and Air Force as the participating Services. The Navy has been designated as the lead Service. JECSIM is chartered to investigate the utility of digital models and simulation in the test and evaluation of threat semi-active missiles against friendly forces electronic countermeasures (ECM), fighter, helicopter, and large aircraft utilized in both developmental test and evaluation (DT&E) and operational test and evaluation (OT&E). JECSIM will evaluate the present utility and credibility of existing models and simulations (M&S) of semi-active threats and ECM systems for T&E; identify the critical constraints, concerns, and methodologies when using these M&S for T&E; and finally, identify the requirements that must be introduced into M&S if they are to support a more comprehensive T&E capability in the future.

Purpose:
The premise of this Joint Test & Evaluation is that digital models, properly validated with hardware-in-the-loop (including Ground Mounted Seeker and Captive Flight) and flight test data, can provide a means of evaluating a wide range of EC test scenarios, improving the T&E process and providing significant cost savings to the acquisition community. The approach is to test semi-active missile systems against multiple ECM techniques employed by helicopter, fighter and bomber sized targets, compare results to model and simulation (M&S) predictions, and correlate between model results and live test results.

Issues:
There are major limitations in the current DoD capability to evaluate the effectiveness of countermeasures. Availability of threat systems is severely limited and simulators are dependent upon the degree and accuracy of intel data. Live fire tests are both limited and are most often used against non-representative drone aircraft. Additionally, the high costs of field testing prevent comprehensive evaluations against a wide range of engagement conditions which can have profound effects on ECM effectiveness. A related limitation is that endgame evaluations (probability of kill) are limited. And finally, test results against threat systems cannot effectively be extended to other variants of the same system.

M&S play an essential role in the DoD life cycle process. M&S are used extensively to support DOD decision making bodies such as the Joint Requirements Oversight Council (JROC), the Defense Planning and Resources Board (DPRB), and the Defense Acquisition Board (DAB). In addition, M&S play an important role in education and training of the military forces of all DoD Components. The systems engineering process, so essential to the program office and the decision making bodies, is intended to provide disciplined engineering during all system life cycle phases. Throughout this process, analysis forms the foundation for the systems engineering performed. The keys to successful analyses are the tools used, specifically M&S.

Because of budget pressures, downsizing, consolidation, acquisition reform, technology advancements, and realignment there is a major thrust in DoD to emphasize test and evaluation supported by simulation to become allied with acquisition programs from their inception. Models and simulations are needed to support test design, extrapolate test data to the engagement/mission and theater levels. The interdependent manner in which simulation and test tools are applied to support the acquisition process and remain available for reuse throughout the system life cycle is key to cost effective acquisition. Funding shortages, complex systems, competition within DoD for dollars, and the overall reduction of resources have caused the Services to take a closer look at model and simulation (M&S) applications through the DoD. A key finding of this effort was the lack of a standard approach for M&S application during requirements planning, system acquisition, and operation and support phases.

Current Activity:
All laboratory, facility, and field testing have been completed. The JECSIM JT&E is in the final phase of predicting the test results with the latest version of the threat simulation and conducting a utility assessment of the simulation's strenghts and weaknesses. The final report is currently being drafted and will cover the process/methodology used, a simulation assessment, and future requirements for M&S use in test and evaluation.

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WebSite: www.acq.osd.mil/te/programs/jte for additional information on the JT&E Program.